Defender 500系列

用户手册

简介

祝贺你！您选择了Denfender 500系列的具有可靠Drycal技术的一级流量校准器，Defender 510和Defender 520型均能为你提供示数±1%误差的准确度，同时便携耐用的设计方式可使你方便的用于空气采样泵在现场进行校准。

在仪器使用前，我们建议你花一些时间浏览该手册以熟悉你的Defender。如果你有关于该仪器使用的任何问题，请通过公司网站(www.biosint.com) 与Bios联系或打电话 973.492.8400向我们高级技术支持工程师咨询。

关于Defender

Defender是一个真正的能够提供即时流量显示的一级标准仪器，精确度为示数的±1%。它的准确性和快速操作性使它成为一个极好的校准工具，能以负压或正压应用模式将设定的流量快速准确的显示在空气采样泵上。

Defender 520型仪器的可选功能更多，它在气路系统使用综合的温度和压力传感器以记录校准期间的周围环境。作为一个理想的“三合一”校准器，Defender 520型能提供扩展跟踪-流速、温度和压力-而不需要额外的仪器。

Defender是由一个内置的铅蓄电池提供能量（仪器中包括），这种电池没有记忆效应，即使仪器在使用时也可以连续充电，

Defender的特点是具有on/off控制按钮，液晶显示屏和方便的键盘控制。通过触摸键盘上的右、左、上和下箭头控制在不同的命令屏上操作

Defender标配有以下配件：

交流适配器/充电器

Bios Optimizer 软件安装光盘

电脑串口数据线

塑料的泄漏测试帽（2）； 在泄漏测试时使用

校准证书

使用手册

软质包装盒子或硬质包装盒，可从Bios或Bios经销商处购买

Defender操作

开始使用

尽管Defender的电池出厂时已经充电，但我们建议你第一次使用时应使用交流电源适配器/充电器将新电池充满电，初次充电时间约8小时。

初次充电后，你可以继续将它连在充电器上给Defender充电，另外还需注意应每隔三个月给Defender至少充电一次以延长电池寿命。

按控制面板右下角的开/关按钮1秒钟开Denfer，持续按开/关按钮3秒钟关defender。

开始时，仪器出现闪烁的屏幕显示产品名字、序列号和流量范围。Defender的集成电池指示器可使你清楚仪器的电量水平。完全充电后指示器就会以一个灰暗的电池图标指示。如果电池电量降低，指示器就会以20%的幅度降低直到屏幕上显示出空的电池图标。

Defender屏幕上的菜单操作简单而直观。只需要按控制面板上的四个箭头就能以一定方向在各个菜单选项间转换：右箭头向前，左箭头向后，上箭头向上和下箭头向下。

在菜单内所处的位置就会以相反的类型突出显示。在方括号（如<>）内的菜单条目表明该条目中存在多重选项。如果选择了该条目，这些选项就会显示。

要选择突出显示的条目，按控制面板上的ENTER键。

如果准备好了，进入SETUP并花上一点时间研究一下Defender的一些用户自定义的设定，如流量单位，单一或连续测量；显示屏尺寸的选择（只适用于520型）；日期和时间设定。另外，你还可以在flow average选择测定数目，在测量之间选择时间，以及选择为确认泵在典型的运行周期内是否以厂商规定的规范运行而具有的能够核查一个典型采样期间空气采样泵性能的选项。

Bios Optimizer软件

Defender购买时标配的软件为Bios Optimizer 110，该软件能将校准数据实时下载到电脑上。使用Bios Optimizer 110软件简单而且不需要改变你的Defender的设置。一旦Optimizer安装，只需要使用Defender的RS-232光缆将你的Defender数据端口和计算机RS-232（串口）相连，然后就可以开始测量。

测量时，你的电脑显示屏上就会显示实时校准数据，运行平均的数据和流量读数的图形表示。对于Defender 520型，环境温度和压力条件也会显示。点Start开始记录，校准数据会自动储存为文本文件，同时你电脑上的文件位置就会显示在Bios Optimizer 110首页上。文本文件资料可以用一定软件程序如EXEL打开，必要的话可以自己定制。

For the ultimate audit trail, an upgrade to Bios Optimizer 120 is available. Bios Optimizer 120 software provides a comprehensive calibration database, complete with air sampling pump profiles (including pump models and serial numbers), employee information, searchable records and the ability to print personalized calibration certificates for your air sampling pumps. For more information about what the Bios Optimizer 120 upgrade can do for your audit trail, please contact Bios or your Bios distributor.

对于最终的审计追踪，可以升级到Bios Optimizer 120版。Bios Optimizer 120软件可提供全面的校准数据，完整的空气采样泵简介（包括泵型号和序列号），操作人信息，可查询的记录并能为你的空气采样泵打印个性化的校准证书。为获得关于Bios Optimizer 120 升级能对审计跟踪所做的更多信息，请联系Bios或当地Bios 经销商。

If you don’t have an available serial port, you can purchase our approved PC card serial port adapter. Please note that Bios doesn’t recommend or support the use of USB-to–serial port adapters due to known support issues with virtual serial ports.

如果电脑上没有可用的串口，你可以购买我们认可的电脑卡式串口适配器。注意由于众所周知的和实际上串口兼容的问题，Bios不推荐也不支持使用USB到串口适配器

Refer to www.biosint.com for information regarding any available firmware or Bios Optimizer software updates.

参考www.biosint.com以获得关于任何可用的硬件或Bios Optimizer软件升级的信息

Quick Start

快速操作

The Defender is designed to make the calibration of air sampling pumps easy and quick:

Defender的设计方式可使空气泵校准操作简单快速。

1. Connect the pump’s tubing to the appropriate Defender port – either Suction (gas out) or Pressure (gas in), depending on your application – with your filter or sorbent tube between your Defender and the pump. For example, if using an air sampling pump to draw air through a filter or sorbent tube, connect the pump’s tubing to your Defender’s upper barbed fitting (the Suction port). Or, if filling sample bags for the collection of gases and vapors, attach the pump’s tubing to your

Defender’s lower barbed fitting (the Pressure port).

1、将采样泵管与相应的defender端口连接-负压口（标注gas out）或正压口（标注gas in），接哪个口根据你的需要-在泵和defend之间接上滤膜或吸附管。例如如果用滤膜或吸附管采集空气样品，将泵管和Defender上部的负压口（标注gas out）相连；如果用采气袋采集气体和蒸气，将泵管和Defender下部的正压口端（标注gas in）相连。

2. The splash screen defaults to MEASURE; press ENTER.

2、闪烁的屏幕默认为测量；按回车键。

3. Select Single and press ENTER. A single measurement is initiated. Repeat this process to continue taking manual measurements one at a time or, switch to Continuous for a continuous uninterrupted stream of measurements.

3、选择Single然后按ENTER。启动一个单一测量。重复该步骤继续进行手动测量或转换到Continuous进行连续测量。

4. Detach the pump’s tubing from your Defender when done setting its flow rate. Your sampling pump is now calibrated and ready to begin sampling.

4、完成设定流速后，将泵管从Defender上卸下。泵已完成校准并已准备好运行。

Application Notes

When taking measurements, your Defender displays the actual flow rate generated by the air sampling pump. Individual measurements, the running average of all measurements and the number of measurements in the average are provided simultaneously. Calibrate your pump by increasing or decreasing the pump’s flow until the Defender’s display indicates your desired flow rate.

注意事项：

测量时，Defender上显示出空气泵产生的实际流量。可同时给出一次测量数值，所有测量的平均值和测量次数。通过增加或减少泵的流量来校准泵流量直到显示屏上出现预期的流量。

Customizing Your Calibration

Calibration of air sampling pumps can be customized and automated for your convenience. To customize each option, move between selections using the up and down arrows. When a selection is highlighted, use the right and left arrows to toggle between your choices for that selection. Press CONFIRM to save any changes and return to SETUP, or press EXIT to return to SETUP without saving any changes.

定制校准

空气采样泵的校准可以方便的定制和自动化。要定制每个选项，用向上和向下箭头在各选项之间移动。当某个选项突出显示时，使用向左和右箭头在该选项内的选择之间移动。按CONFIRM保存修改并返回SETUP，或按EXIT不作保存返回SETUP。

Setup

设定：

From the splash screen, choose SETUP to access the following customizable options:
在出现闪烁的屏幕时，选择SETUP进入下面列出的自定义选项：

• READINGS. Choose your preferred number of measurements in the average, from 1 to 100. If you wish to measure in time intervals, set the time between measurements from 1 to 60 minutes.

READINGS。选择你想要的平均测量次数，从1到100。如果你想以一定时间间隔测量，设定1到60分钟的间隔时间。

• UNITS. View flow measurements in cubic centimeters, milliliters, liters or cubic feet (all units are per minute).
In the Defender 520 model, view pressure in mmHg, kPa or PSI and temperature in Celsius or Fahrenheit.

UNITS。查看流量，有立方厘米、毫升、升或立方英尺（所有单位为每分钟）。对于Denfender 520型，还可以查看压力：有mmHg，kPa或PSI，温度：摄氏温度或华氏温度。

• TIME. Set the current time in the format you prefer.

TIME。以你想要的格式设定当前时间

• DATE. Set the month/date/year in the format you prefer.

DATE。以你想要的格式设定月/日/年。

• PREFERENCES. Read Default offers a choice of Single, Continuous or Burst measurements; choose the type of flow measurement you will normally use. Once selected, your Defender will always default to this setting when Measure is selected. Default Settings allows you to reset your Defender to the factory defaults. In the Defender 520 model, Magnification controls the amount of data on the display; choose Zoom to view only flow measurements in larger font, or choose Detail to simultaneously view flow measurements, temperature conditions, and pressure conditions in smaller font.

参数选择。参照默认可选的选项Single, Continuous或Burst测量。选择一个流量测量类型你就可正常使用。选择后，测量时Defender就总是默认到该设定。默认的设定允许你重设Defender到出厂默认状态。对于520型Defender，Magnification控制显示的日期数量；选择Zoom以大号字体只查看流量测定，或选择Detail以小号字体同时查看流量测定、环境温度和压力。

PREFENRENCES。参数选择

• POWER. Power Save defaults to On, which enables a five minute auto shut-off feature that turns your Defender off after five minutes of inactivity (unless plugged into AC power). Change the default to No if you want your Defender to remain on until you manually turn it off. Backlight allows you to turn the LCD backlight on for illumination or off to conserve battery power. Note: Setting Power Save to off when the Definer 220 is not connected to the adapter/charger will use all available battery power.

POWER。电量节省（Power Save）默认为On，这将激活5分钟的自动关机功能，从而使Defender在静止5分钟后关闭（如果不接交流电源的话）。如果你想让Defender一直开着直到你手动关闭，请将默认改变到No。Backlight允许你将显示屏背灯打开来照明或关闭以节省电量。

注意：当Definer 220没有与适配器/充电器相连时将电量节省设定为关时，将会使用所有的可用的电池能量。

• DIAGNOSTICS. Gives you access to the integrated Leak Test function. To run the Leak Test follow the on-screen prompts. Please note, the Defender Leak Test is designed only to verify the internal integrity of the instrument and alert you to an internal leak. We recommend performing the Leak Test only as an intermediate quality control check or whenever the integrity of the instrument is questioned due to accidental misuse or inadvertent damage. Please keep in mind that the Leak Test is not a substitute for a comprehensive examination of the unit's overall performance, and a successful Leak Test does not ensure that your Defender is operating accurately. For this purpose, Bios offers Recertification, our full-service package (see Recertification).

DIAGNOSTICS。让你进入到综合的泄漏检测功能。按照屏幕提示运行泄漏检测功能。注意，Defender的泄漏测试的设计是只能检测内部仪器的完整，在发生泄漏时发出警告。我们建议只当作中间质量控制或当仪器由于偶然错误使用或无意损坏而导致仪器发生问题时运行泄漏测试。请牢记泄漏测试不适用于仪器总性能的全面检查，并且泄漏测试通过并不能确保Defender的结果准确。基于这样的原因，Bios提供换发新证，全面服务打包（见换发新证）

• ABOUT. Tells you more about your Defender; a useful screen to refer to when speaking with a Bios technical support representative or your Bios distributor.

ABOUT。显示更多关于Defender的信息。当与Bios技术支持或销售代表谈话时可供参考的一个有用的屏幕单元

If at any time you'd like to return your Defender to its factory default settings, navigate to Preferences, set Default Settings to Yes and then Confirm the changes.

任何时候如果你想将Defender返回到工厂初始状态，将菜单调到Preferences，设定默认设定（Default Settings）到YES

然后确认改变。

Measure

测量

Once you've finished customizing your Defender's SETUP and have confirmed your changes, select MEASURE to begin a set of measurements. MEASURE gives you access to TAKE MEASUREMENTS, where you can choose between the

following flow measurement options:

一旦完成设定并确认你的改变，选择MEASURE开始一系列测量。MEASURE可使你进入TAKE MEASUREMENTS，在这里你可以在下面的流量测量选项中选择：

- **Single.** A manual measurement with a running average (default is 10 measurements in the average and is user-definable from 1 to 100).

Single---应用运行平均进行手动测量（缺省值：平均为10次测量，用户可定义的测量为从1到100）。

- **Cont.** Continuous hands-free measurements with an on-screen running average (default is 10 measurements in the average and is user-definable from 1 to 100).

Cont---应用平均运行进行连续的手动测量（缺省值：平均为10次测量，用户可定义的测量为从1到100）。

- **Burst.** A stream of hands-free measurements taken in a user-definable grouping of 1 to 100 measurements. Once completed, no more measurements are taken until another Burst is initiated.

Burst--在用户自定义的1-100次测量组内进行一系列手动测量。结束后，激活下一个Burst才能进行更多的测量。

Select the type of flow measurement you want, then press ENTER. The flow cell viewing window lights up, and the Defender instantly begins taking flow measurements.

选择你想要的一种流量测定类型，然后按ENTER。流量单元查看窗口就亮，Denfender将立即开始流量测定。

You can stop a series of hands-free measurements at any time by choosing either PAUSE or RESET. PAUSE terminates the flow measurement or sequence of flow measurements but leaves the flow results on the screen, while RESET terminates the flow measurement or sequence of flow measurements and clears the screen, allowing a new sequence of measurements to begin.

你可以在任何时候按PAUSE或RESET键停止一系列的手动控制测定。PAUSE中断流量测定或测定序列但会在屏幕上显示流量测定结果，而RESET会中断流量测定或测定序列但同时清除屏幕上的结果，然后开始一个新的测定序列。

EXIT returns you to the TAKE MEASUREMENTS screen, and SETUP allows you to further customize your Defender’s operation.

EXIT让你返回到TAKE MEASUREMENTS屏幕，同时SETUP允许你进一步定制Defender的操作。

Out of Range!

If your sampling pump is generating more flow than your Defender’s rated flow range, the “Out of Range!” warning appears when you attempt to take a flow measurement. Immediately lower or disconnect the pump’s flow. When the flow is within the proper range, choose RESET to clear your Defender’s last measurement, or try to take a new measurement. You may verify your Defender’s flow range by navigating to SETUP, then About.

超限

如果你的采样泵的流量超过Defender的流量范围，在进行流量测定时会出现“out of ranger”的警告。应立即降低泵流量或关闭泵。当流量在正确的范围内时，选择RESET清除Defender上最后的测定，或开始一个新的测量。你可以将菜单调到SETUP选About来确证defender的流量范围。

Reset Function

If your Defender fails to respond to push-button commands, try resetting the unit by pressing the reset button on the back. This can be done easily with a bent paper clip. Please note that resetting your Defender will not affect your user settings. However, if you are in the middle of a calibration, your Defender will return to the initial measurement phase and you’ll need to initiate a new flow measurement.

重启：

如果defender对push按钮不能响应，可以试试按后面的重启键重启该单元。用一弯曲的回形针能操作。注意重设Defender不会影响用户设定。但如果你处于校准中间，Defender会返回到初始测量状态，你必须重新启动一个新的流量测定。

Annual Maintenance and Calibration

每年的维护和校准

Your Defender is engineered to provide years of reliable service, with appropriate care and maintenance. Bios recommends annual calibration by an ISO 17025-accredited laboratory, such as Bios, to help ensure the best possible flow measurements, meet regulatory requirements and provide a bulletproof audit trail in the event of litigation. If you should encounter any problems with your Defender, immediately contact Bios Customer Service and provide a detailed description of your situation, including the Defender model and serial number, information about the air sampling pump and the current sample train, the environmental conditions during the test, the flow point or points that you’re checking and a detailed explanation of the issue you’re experiencing.

Defender设计为提供年度的相关服务，包括相应的维护和保养。Bios建议应由通过ISO17025认证的厂家进行校准，如Bios，以确保仪器具有最好的流量测定性能，满足法规要求，并可以为诉讼提供可靠的证据。如果你遇到关于Defender的任何问题，请尽快与Bios客户服务中心联系并提供有关问题的详细描述，包括Defender的型号、序列号、空气泵的信息和当前的样品类型，测试时的环境状态、流量或你正校验的流量和你遇到的问题的详细说明。

Recertification

换发新证

Your Defender is a precision measuring standard with moving parts machined to extremely close tolerances. Various environmental factors, product wear, drift of the temperature sensors and pressure transducers used for recording ambient calibration conditions (Defender 520), or inadvertent damage may adversely affect your Defender’s measurement accuracy or general performance.

Defender是一个在绝对封闭区域内进行机械运动来测量的精密测量标准。不同环境因素、产品磨损、温度传感器和用于记录环境校准条件的压力传感器(Defender 520)的移动,或无意识的损坏都可能会对Denfender的精确测量或仪器性能产生不利影响。

For these reasons, Bios highly recommends having your Defender annually verified by an ISO 17025–accredited laboratory, such as Bios, to ensure its measurement integrity. For those applications subject to regulatory or ISO requirements, verification by a laboratory accredited to the international calibration standards set by ISO provides you with assurance of measurement integrity and a defensible audit trail in the event of litigation.

基于这些原因，Bios强烈建议每年应由经过ISO-17025认证的厂家如Bios对你的Defender进行检测，以确保它测定的数据真实完整。对于适应法规或ISO要求的应用，由ISO规定的的获得国际校准标准认可的实验室进行确证可为你提供有关测定完整性的保证和用于诉讼过程的可靠的审计追踪。

For the ultimate in Defender maintenance and to take advantage of any available software and mechanical upgrades, Bios offers an elective Recertification program. This is a complete product service package that provides pre-calibration; complete product refurbishment, testing and available upgrades; post-calibration; and NIST-traceable, ISO 17025–, ANSI Z-540– and NIST Handbook 150–backed calibration certificates. Recertification includes a 90-day service warranty should any related labor or parts replacements prove faulty.

对于最后在Defender的维护和利用所有可用的软件和硬件升级，Bios提供可选的换证程序。这是一个完全的产品服务方案，能提供预校准；完整的产品修理，测试和可选升级；后校准；同时能提供NIST追踪，ISO17025-，ANSI Z-540和NIST手册150-支持的校准证书。新证包括90天的服务保证。

Turnaround time is generally two weeks from time of receipt. For an expedite fee, we will place your Defender “next on bench” for 48-hour turnaround. This means that a Defender received on Monday will be return-shipped on Wednesday, and a Defender received on Friday will be return-shipped on Tuesday. For a detailed explanation of the 48 hour process and to obtain current pricing for Recertification, please contact Bios at 973.492.8400 or visit our web site at

www.biosint.com.

换发新证从我们接收到仪器起返回时间一般为两周。如果你付加急的费用，我们会将你的Defender置于“下一候补”状态，该方式下周转时间为48小时。这意味着周一收到你的Defender周三就会返回，周五收到就在下周二返回。想得到48小时程序的详细说明和现在换新证的价格，请拨打9734928400联系Bios或访问我们的网站www.biosint.com.

Please note that while any ISO 17025–accredited gas flow measurement laboratory may be capable of verifying the accuracy of your Defender, Bios is the only authorized service center for Bios products. All Defender service and calibration is performed in our ISO 17025–accredited laboratory in New Jersey by experienced Bios personnel.

注意虽然任何一个ISO 17025认证的气体流量检测实验室都能够检测你的Defender的精确性，但也只有Bios是Bios产品的唯一权威服务中心。所有的Defender服务和校准都由我们的经ISO认可的位于新泽西的实验室内的有经验的工作人员完成。

Sending Your Defender to Bios

发送你的Defender到Bios

Please contact Bios for an RMA (return merchandise authorization) number before sending your Defender to our factory for elective Recertification or other service. You can get an RMA number through our automated web-based system at www.drycal.com/forms/rma.htm, by email to service@biosint.com, or by telephone at 973.492.8400. Our web site address is www.biosint.com.

在将你的Defender返回我们工厂得到更换新证或其它服务之前，请先联系Bios获得返回产品批准（RMA）号。你也可以通过我们在www.drycal.com/forms/rma.htm上的自动网络基础系统，发送email到service@biosint.com或打电话9734928400得到RMA号。我们的网站地址为www.biosint.com.

Sending your Defender to Bios without an RMA number may result in return of the instrument without inspection or a substantial delay in service turnaround time.

如果没有RMA号而直接将你的Defender返回到Bios可能会导致产品不被检查就给你返回或使得维修时间延长。

When requesting an RMA number, provide your Defender model, serial number and revision level. Also describe any product issues you may be experiencing. Please keep in mind that Bios will not begin evaluation and service of your Defender until you have accepted and approved, in writing, our formal RMA quote for service. This protects both you and Bios during this process and ensures a fair and efficient service experience.

要求RMA号时，需提供你的Defender型号，序列号和版号。同时也最好描述你遇到的关于产品的任何问题。请耐心等待，直到你已接受和确认我们手写的正式RMA服务报价后，Bios才开始对你的Denfender进行检查和维修。这样可在维修过程中保护你和Bios的利益，并能确保一个公平和有效的服务。

If sending your Defender for repair or evaluation (rather than elective Recertification), please contact Bios for technical support or troubleshooting assistance prior to shipping the unit. We will first attempt to resolve the situation over the phone or via email. If you’ve provided us with a detailed description of your Defender’s issue and application details and we’re unable to resolve the situation by phone or email, we’ll issue you an RMA number for prompt return of your Defender for evaluation.

如果将你的Denfender送回公司修理或评估（不是选择换发新证），在送回之前请先联系Bios以得到技术支持或故障排除帮助。我们首先尝试通过电话或email解决该问题。如果你已经给我们详细描述了有关Defender的问题和应用的全部资料，而我们又不能通过电话或email解决问题，我们会给你提供对Defender进行评估的RMA号。

Please note that Bios will make every attempt to verify your issue, as we want you to get the most out of your Defender. However, if we are unable to detect a product issue or if we determine that the issue is application-related rather than product-related, we reserve the right to charge an evaluation fee.

注意Bios可能会做各种努力以核查你的问题，因此我们希望你尽可能多的提供有关你的Defender之外的信息。然而，如果我们不能发现产品的问题或如果我们确定该问题是与应用有关而不是与产品本身相关，我们保留要求你支付评估费用的权利。

Shipping 运输

When shipping your Defender, please ensure that the packaging is adequate to protect the instrument. Whenever possible, your Defender should be shipped in its original packaging or within a hard case such as a Pelican carrying case

(available for purchase from Bios). We highly recommend using a standard freight carrier (e.g., FedEx, UPS) that supplies tracking numbers and insuring the product against damage in transit.

运输Defender时，确保外包装能够保护仪器。尽可能使用Defender的原始包装或使用硬壳箱子（可从Bios购买）。我们强烈建议你们委托可靠的邮寄公司（例如联邦快递、UPS等），以确保能提供跟踪记录并确保产品在运输过程中不被损坏。

Bios is generally not responsible for freight costs associated with shipments to and from Bios, except in certain instances; please contact Bios for information before initiating a shipment.

除非有特殊约定，Bios一般不负责来回的运输费用；在运输前联系Bios以获取相关信息。

Bios is not responsible for damage that may occur during shipment.

Bios不负责在运输过程中可能发生的损坏。

Storage

If you need to store your Defender for an extended period, please follow these guidelines:

• Always store it in a clean, dry place.

• If possible, leave it attached to its AC power adapter/charger while in storage.

• If your Defender cannot be attached to its AC power adapter/charger while in storage:

– Fully charge it before extended storage. If the battery isn't fully charged prior to storage, it might be permanently damaged.

– Fully charge it at least once every three months.

• When removing your Defender from storage, recharge the battery for at least 12 hours prior to use.

储存：

如果需要长期储存Defender，按照下列要求操作：

要存放在一个清洁、干燥的位置

如果可能，储存时将Defender与它的交流电源适配器/充电器连接

如果Defender储存时不能与它的交流电源适配器/充电器相连：

——长时间储存前应完全充电。如果在储存前不能完全充电，Defender可能会永久损坏。

——每三个月至少完全充电一次

长期储存Defender再次使用前至少再充电12小时。

Defender 500 Series Specifications

Defender 500系列规格

Models:

型号：

510L/520L, from 5-500 mL/min
510M/520M, from 50-5,000 mL/min
510H/520H, from 300-30,000 mL/min

510L/520L系列，5-500ml/min

510M/520M系列，50-5,000 mL/min
510H/520H系列，300-30,000 mL/min

Measurements:

测量

Volumetric Accuracy: ±1% of reading
Time per Measurement: 1-15 seconds (approximate)
Type: Single, Continuous or Burst
Volumetric Flow Units: cc/min, mL/min, L/min, cf/min
Pressure Units (Defender 520): mmHg, PSI, kPa
Temperature Units (Defender 520): °C, °F

体积精度：示数的±1%

每次测量时间：大约1-15秒

类型：单一、连续或脉冲

体积流量单位：cc/min, mL/min, L/min, cf/min

压力单位 **(Defender 520型):** mmHg, PSI, kPa
温度单位**(Defender 520型):** °C, °F

Basics:

Dimensions (H x W x D): 5.5 x 6 x 3 in / 140 x 150 x 75 mm
Weight: 29 oz / 820 g
Configuration: Integrated flow measuring cell, valve and timing mechanism
Temperature & Pressure Sensors (Defender 520 model only): In the flow stream
Press.: 3.5 mmHg (typical), 7.0 mm (max);
Temp.: 0.8° C (typical), 1.3° C (max)
AC Adapter/Charger: 12V DC, >250ma, 2.5 mm, center positive
Battery: 6V rechargeable, sealed lead-acid, 6-8 hours typical operation
Battery Operational Time (5 cycles/min): 3 hrs backlight on, 8 hrs backlight off
Pressure & Suction Fittings: ¼" barbed tube fittings
Display: Backlit graphical LCD

规格：

尺寸**(H x W x D)**：5.5 x 6 x 3 in / 140 x 150 x 75 mm

重量：29 oz / 820 g

结构：完整的流量测量单元、阀和定时装置

温度和压力传感器（只适用于**Defender 520**型）：

压力：3.5 mmHg (典型), 7.0 mmHg (最大)

温度：0.8° C (典型), 1.3° C (最大)

交流适配器/充电器： 12V DC, >250ma, 2.5 mm, 中心正极
电池: 6V可充电的、密闭铅蓄电池,典型操作时间 6-8小时
电池操作时间 (5个循环/min): 背灯亮时3个小时,背灯不亮时8个小时

正压和负压适配器：1/4英寸管式适配器

显示屏：流线型液晶显示屏

Usage:

Flow Modes: Suction or Pressure
Operating Pressure (Absolute): 15 PSI
Operating Temperature: 0-50° C
Ambient Humidity: 0–70%, non-condensing
Storage Temperature: 0–70 °C
Warranty: 1 year; battery 6 months

应用：

流量模式：负压或正压

操作压力（绝对）：15PSI

操作温度：0-50° C

环境湿度：0–70%，无冷凝

储存温度：0–70 °C

质保：1年；电池6个月

Bios Optimizer Software

Requires Windows XP–SP2 or Windows 2000–SP3 compatible PC and RS-232 (serial) connection

Bios Optimizer 110 installation CD (supplied); no restrictions apply

RS-232 cable (supplied) for Defender 500 Series data port to PC RS-232 (serial) port connection

PC Card (optional and as necessary) creates an RS-232 port on your PC

Licensed upgrade to Bios Optimizer 120 is available

Bios Optimizer软件

要求Windows XP-SP2或Windows 2000–SP3，能兼容PC和RS-232连接

Bios Optimizer 110安装光盘（已提供）；无应用限制

RS-232光缆（已提供），用于Defender 500型数据端口和PC RS-232（串口）端口连接

电脑卡（可选的同样也是必须的），要在你电脑上建立一个RS-232端口

可升级到Bios Optimizer 120的许可

Limited Warranty

质量保证

The Bios Defender 500 Series is warranted to the original end user to be free from defects in materials and workmanship under normal use and service for a period of one year from the date of purchase as shown on the purchaser’s receipt.

The Defender 500 Series’ battery is warranted for six months from the original purchase date. If the unit was purchased from an authorized reseller, a copy of an invoice or packing slip showing the date of purchase may be required to obtain warranty service.

Bios Defender 500系列保证用户在正常使用情况下不会因为产品材料和工艺缺陷而出现仪器问题，并保证一年的质量保证期，时间从发票上显示的购买日期算起。Defender 500系列电池从购买之日起质保期为6个月。如果仪器是从授权经销商处购买，发货单的复印件或包装单显示的购买日期是获得质保服务而必须的。

The obligation of Bios International Corporation under this warranty shall be limited to repair or replacement (at our option),

during the warranty period, of any part that proves defective in material or workmanship under normal use and service, provided the product is returned to Bios International Corporation, transportation charges prepaid.

该保证下，Bios公司的责任只限于质保期内修理或更换（在我们允许情况下）证实有原料缺陷的任何零件或在正常使用和服务过程中的工艺原因。如果产品需返回到Bios公司，运输费由客户预付。

Notwithstanding the foregoing, Bios International Corporation shall have no liability to repair or replace any Bios International Corporation product:

尽管前面已经说明，但公司对以下情况不负责修理或替换：

1. That has been damaged following sale, including but not limited to damage resulting from improper electrical voltages or currents, defacement, misuse, abuse, neglect, accident, fire, flood, terrorism, act of God or use in violation of the instructions furnished by Bios International Corporation;

1、售出后发生损坏，包括但不限于由于不正确的电压或电流，磨损、误用、滥用、疏忽、事故、火灾、水淹、恐怖、无限操作或在未按照公司提供的说明书使用而导致的损坏。

2. When the serial number has been altered or removed; or

2、序列号发生改变或移动；或

3. That has been repaired, altered or maintained by any person or party other than Bios International Corporation’s own service facility or a Bios authorized service center, should one be established.

3、由任何个人或团体而不是Bios公司的售后服务中心或Bios授权的服务中心维护、改变或维修，而需要重新建立质量保证的。

This warranty is in lieu of all other warranties and all other obligations or liabilities arising as a result of any defect or deficiency of the product, whether in contract or in tort or otherwise. All other warranties, expressed or implied, including any implied warranties of merchantability and fitness for a particular purpose, are specifically excluded.

该保证可代替由于产品任何缺陷导致的后果而引起的所有其他的保证和责任，不论是否以合同或其他方式制定。所有其他的保证，不论是明确的还是暗指的，包括任何以特定目的而暗示的产品的和配件的质量保证，均排除在外。

In no event shall Bios be liable for any special, incidental or consequential damages for breach of this or any other warranty, express or implied, whatsoever.

任何情况下 Bios 都不承担因违背该保证或其他明确的或暗指的保证而出现的任何特殊的、偶然的或永久的损害的责任